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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/727,270	12/03/2003	Maria-Magdalena Nay	14XZ126392	4808
23413	7590	01/30/2007		
CANTOR COLBURN, LLP 55 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002			EXAMINER LAVIN, CHRISTOPHER L	
			ART UNIT	PAPER NUMBER
			2624	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/30/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

**Office Action Summary**

Application No.

10/727,270

Applicant(s)

NAY ET AL.

Examiner

Christopher L. Lavin

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 15 September 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,24 and 26-29 is/are rejected.
- 7) ☐ Claim(s) 3-23 and 25 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 09/15/04.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Claim Objections*

1. Applicant is advised that should claim 27 be found allowable, claims 28 and 29 will be objected to under 37 CFR 1.75 as being substantial duplicates thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

### *Claim Rejections - 35 USC § 101*

2. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claim 27 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claim 27 recites a "computer program" that imparts the method of claim 1. However, the claim does not require that the program reside on a computer readable medium, or that it is actually on a computer. A "computer program" per se. is not an apparatus, method, a product or a composition of matter. Rather, a computer program is an intangible thing, and thus non-statutory. This type of information is considered "functional descriptive material" and is non-statutory per se. MPEP 2106(IV)(B)(1)(a)) states (with emphasis added),

"Since a computer program is merely a set of instructions capable of being executed by a computer, the computer program itself is not a process and Office personnel should treat a claim for a computer program, without the computer-readable medium needed to realize the computer program's functionality, as nonstatutory functional descriptive material. When a computer program is claimed in a process where the computer is executing the computer program's instructions, Office personnel should treat the claim as a process claim. See

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paragraph IV.B.2(b), below. When a computer program is recited in conjunction with a physical structure, such as a computer memory, Office personnel should treat the claim as a product claim. See paragraph IV.B.2(a), below.

A computer program (or method steps performed by a computer program) IS statutory if it is claimed as being recorded on a "computer readable medium", or a "computer memory". The examiner suggests incorporating the limitations of a "computer readable medium into claim 27 to overcome this rejection. This will be assumed for examination purposes.

Claim 28 is also rejected under 35 U.S.C. 101. A computer "useable" medium is not a computer "readable" medium.

***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1, 2, 24 and 26 – 29 are rejected under 35 U.S.C. 102(e) as being anticipated by Argiro (7,031,504).

In regards to claim 1, A process for detection of cardiac movement comprising: a. acquiring a series of successive images  $I_n$  of the region of a heart (col. 5, line 66 – col. 6, line 15); b. analyzing at least some of the images thus acquired to identify a heart

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movement (col. 6, lines 36 – 45); and c. determining the cardiac cycle starting from this movement (col. 6, lines 36 – 45).

In regards to claim 2, The process according to claim 1 comprising: a. acquisition of a series of successive images  $I_n$  of the region of the heart (col. 5, line 66 – col. 6, line 15)); b. determination of a cranio-caudal axis of the heart (col. 4, line 66 – col. 5, line 6: In the preferred embodiment the images are obtained along the cranio-caudal axis.); c. for each image  $I_n$ , calculation of the series of images of a set of attenuation coefficients of points on the image representing vessels in the region of the heart along lines perpendicular to the cranio-caudal axis of the heart (Step c is ambiguous with respect to the phrase “along lines perpendicular to the cranio-caudal axis of the heart”. It is the examiner’s belief that the applicant intended to have this phrase modify “attenuation coefficients”; however, current it appears to be either modifying “the image” or “vessels”. Further dependent claims (for example claim 3) clarify the confusion. Until claim 2 is clarified the examiner will have to interrupt it as meaning any of the three. Therefore, an attenuation coefficient can be interrupted as the gray scale values captured by the imaging device. Argiro teaches of (col. 6, lines 51 – 63; col. 13, lines 1 – 7) detecting blood vessels, in the preferred embodiment the aorta, to determine the cardiac cycle. The images of the heart would be along perpendicular lines to the cranio-caudal axis.); d. calculation of the integral overrun  $k_{n,n+2}$  between two successive images  $I_n$  and  $I_{n+1}$  of the series of images starting from the set of attenuation coefficients calculated for each of the two successive images (col. 10, line 50 – col. 12, line 32); and e. determination of

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the cardiac cycle starting from all previously calculated integral displacements (Figure 4, item 410).

In regards to claim 24, The process according to claim 1 comprising: f. choose a subset of synchronous images in the heart cycle from the series of images, starting from the previously determined cardiac cycle (col. 5, lines 17 – 24).

In regards to claim 26, A radiography apparatus comprising: means for providing a source of radiation (col. 4, line 66 – col. 5, line 6); means for recording images facing the source (col. 4, line 66 – col. 5, line 6); means for support placed between the source and the means for recording images on which there is a patient for whom a region of a heart is to be imaged, wherein the radiography apparatus comprises means for implementing the process of claim 1 (col. 4, line 66 – col. 5, line 6).

In regards to claim 27 – 29 (col. 5, lines 25 – 32).

***Allowable Subject Matter***

5. Claims 3 – 23 and 25 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

6. The following is a statement of reasons for the indication of allowable subject matter: The art of record does not teach nor does it suggest the specific features called for in the claims, in particular the concept of computing attenuation coefficients along lines perpendicular to the cranio-caudal axis of the heart to compute the movement of vessels in the heart region in order to determine the cardiac cycle. Argiro is the only reference the examiner could find that teaches the general concept of the invention,

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mainly tracking blood vessels in the heart to determine the cardiac cycle. Argiro, however, tracks the blood vessels in a different manner than the applicants teach, there would be no reason to switch to the applicant's approach in Argiro.

***Conclusion***

7. The examiner would like to suggest that the applicant could overcome Argiro by combining claims 1 and 2 and correcting the ambiguity in claim 2.c.

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

9. US Pat. 5,533,085 discloses finding the systolic and diastolic images in an angiogram.

10. US Pat. 6,554,774 teaches measuring the diameter of a blood vessel.

11. US Pat. 6,426,987 on of many teachings that shows self-gating without the use of ECG.

12. Corney et al, "Cyclic Flow Patterns in Human Coronary Arteries", Computers in Cardiology 2001, 23-26 Sept. 2001 Page(s): 21 – 24: teaches of tracking blood vessels in the heart through the cardiac cycle.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher L. Lavin whose telephone number is 571-272-7392. The examiner can normally be reached on M - F (8:30 - 5:00).


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh M. Mehta can be reached on (571) 272-7453. The fax phone

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number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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